



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,562	09/23/2003	Jose A. Tierno	YOR920030375US1	3065

7590 04/03/2007
Ryan, Mason & Lewis, LLP
90 Forest Avenue
Locust Valley, NY 11560

EXAMINER

MALEK, LEILA

ART UNIT	PAPER NUMBER
----------	--------------

2611

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

54

Office Action Summary	Application No.	Applicant(s)	
	10/668,562	TIERNO, JOSE A.	
	Examiner	Art Unit	
	Leila Malek	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09/23/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

1. Applicant's arguments, see page 8, lines 25 and 26, filed on 01/31/2007, with respect to the rejection(s) of claim(s) 1, 11, and 21 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made, see below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3, 9-11, 13, and 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ariyavisitakul et al. (hereafter, referred as Ariyavisitakul) (US 5,222,101), in view of Thon (US 7,075,363).

As to claim 1, Ariyavisitakul discloses a method of equalizing (see Fig. 1 and column 1, last paragraph) an input signal 101 received from a communication channel, comprising the steps of: generating at least one sampling from the received input signal based on a clock signal (see block 104 and column 10 last paragraph) (i.e. inherently by using a clock signal); and compensating for distortion associated with the communications channel based on at least a portion of the at least one generated sampling (see the abstract, lines 3-5). Ariyavisitakul discloses all the subject matters

Art Unit: 2611

claimed in claim 1, except that the sampling clock is not related to the clock signal used to recover data associated with the received input signal. Thon, in the same field of endeavor, discloses a communication system comprising a FIR equalizer and clock data recovery circuit. Thon further discloses "the clock data recovery circuits recover the data at the receiver without the sampling clock from the transmitter (i.e., a separate clock is generated at the receiver)" (See column 3, lines 8-13). Therefore, Thon teaches that the clock used for sampling the incoming data is not related (i.e., unrelated) to the clock used for data recovery purposes. It would have been obvious to one of ordinary skill in the art at the time of invention to use a clock for sampling the received signal unrelated to the clock used for data recovery purposes to make the process of data recovery faster (i.e. without spending time on recovering the clock of the transmitter and by using receiver's local clock).

As to claim 11, Ariyavisitakul discloses an apparatus (see Fig. 1) for equalizing an input signal 101 received from a communication channel (see column 10, last paragraph), comprising: a memory 105; and at least one processor coupled to the memory and operative to: (i) generate at least one sampling from the received input signal (see block 104 and column 10 last paragraph) (i.e. inherently by using a clock signal); and (ii) compensate for distortion associated with the communications channel based on at least a portion of the at least one generated sampling (see the abstract, lines 3-5). Ariyavisitakul discloses all the subject matters claimed in claim 11, except that the sampling clock is not related to the clock signal used to recover data associated with the received input signal. Thon, in the same field of endeavor, discloses a

communication system comprising a FIR equalizer and clock data recovery circuit (see Fig. 1). Thon further discloses "the clock data recovery circuits recover the data at the receiver without the sampling clock from the transmitter (i.e., a separate clock is generated at the receiver)" (See column 3, lines 8-13). Therefore, Thon teaches that the clock used for sampling the incoming data is not related (i.e., unrelated) to the clock used for data recovery purposes. It would have been obvious to one of ordinary skill in the art at the time of invention to use a clock for sampling the received signal unrelated to the clock used for data recovery purposes to make the process of data recovery faster (i.e. without spending time on recovering the clock of the transmitter and by using receiver's local clock).

As to claims 3 and 13, Ariyavisitakul further discloses that the distortion compensating further comprises: setting one or more parameter values based on the at least a portion of the at least one generated sampling (see Fig. 1, block 106, column 10, last paragraph and column 9, lines 33-35); and applying the one or more parameter values to the received input signal (see column 9, lines 35-38).

As to claims 9 and 19, Ariyavisitakul discloses that the communication channel is a digital communications channel (see the abstract and column 1, second paragraph).

As to claims 10 and 20, Ariyavisitakul discloses that the equalization is performed in accordance with a data receiver coupled to the communications channel (see column 10, last paragraph and the abstract).

As to claim 21, Ariyavisitakul discloses an equalization system responsive to an input signal received from a communication channel (see Fig. 1), comprising: a

Art Unit: 2611

sampling module, the sampling module 104 (see column 10, last paragraph) generating at least one sampling from the received input signal (i.e. inherently by using a clock signal); and a filter (equalizer 107), the filter compensating for distortion associated with the communication channel based (see the abstract and column 10, last paragraph and column 1, lines 33-38) on an equalization algorithm which is responsive to at least a portion of the at least one sampling generated by the sampling module (see the abstract, lines 3-5). Ariyavisitakul discloses all the subject matters claimed in claim 1, except that the sampling clock is not related to the clock signal used to recover data associated with the received input signal. Thon, in the same field of endeavor, discloses a communication system comprising a FIR equalizer and clock data recovery circuit (see Fig. 1). Thon further discloses "the clock data recovery circuits recover the data at the receiver without the sampling clock from the transmitter (i.e., a separate clock is generated at the receiver)" (See column 3, lines 8-13). Therefore, Thon teaches that the clock used for sampling the incoming data is not related (i.e., unrelated) to the clock used for data recovery purposes. It would have been obvious to one of ordinary skill in the art at the time of invention to use a clock for sampling the received signal unrelated to the clock used for data recovery purposes to make the process of data recovery faster (i.e. without spending time on recovering the clock of the transmitter and by using receiver's local clock).

As to claim 22, Ariyavisitakul further shows that the equalization system is part of a data receiver (see Fig. 1).

As to claim 23, Thon discloses that the equalization system is independent of a clock and data recovery system of the data receiver (i.e. the clock used for the equalization system is the transmitter clock and is different than the clock used for the data recovery which is the receiver clock) (see column 3, lines 8-13).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 2 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ariyavisitakul and Thon, further in view of Hsu et al. (hereafter, referred as Hsu) (US 2004/0062329).

As to claims 2 and 12, Ariyavisitakul discloses that demodulator 104 oversamples the IF signal at a multiple of the symbol rate since optimum time for sampling the signal is unknown. Ariyavisitakul and Thon are silent in disclosing that the sampling (oversampling) generation step comprises the steps of: generating multiple phases of the sampling clock signal; and sampling the received input signal at the respective multiple phases of the sampling clock signal to generate respective multiple samples. Hsu, in the same field of endeavor, discloses an apparatus (see Fig. 1) comprising an oversampler 24 that samples the data using multiple clocks 26, producing 4 sampled signals. Hsu further discloses that the clocks are generated by a VCO 30 and are clocks of the same frequency and four different phases (see paragraph

0003). It would have been obvious to one of ordinary skill in the art at the time of invention to use multiple phases of a sampling clock to sample the input signal and determine the optimum clock for sampling the incoming data (see paragraph 0003) as suggested by Hsu.

4. Claims 4 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ariyavisitakul and Thon, further in view of Dally et al. (hereafter, referred as Dally) (US 2003/0086339).

As to claims 4 and 14, Ariyavisitakul and Thon are silent in disclosing that the sampling clock signal has a lower frequency than the data recovery clock signal. Dally, in the same field of endeavor, discloses a clock recovery circuit wherein the sample clock is slower (interpreted as having lower frequency) than the data clock (see paragraph 0060). It would have been obvious to one of ordinary skill in the art at the time of invention to make the sample clock slower than the data clock to maintain the synchronization between two clocks (data clock and sample clock) as suggested by Dally (see paragraph 0061) and recover the data.

5. Claims 5, 6, 8, 15, 16, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ariyavisitakul and Thon, further in view of Shattil (US 2004/0243258).

As to claims 5 and 15, Ariyavisitakul and Thon disclose all the subject matters claimed in claims 1 and 11, except for validating the at least one generated sampling. Shattil discloses a receiver (see Fig. 10) comprising: a sampler 1002 to provide samples to selector 1004, wherein the selector provides weights to the samples (interpreted as validating the samples) (see paragraph 0124). It would have been obvious to one of

ordinary skill in the art at the time of invention to modify Ariyavisitakul and Thon as suggested by Shattil to select only samples which their power levels meet a predetermined threshold to enhance the integrity of the output signal.

As to claims 6 and 16, Shattil further discloses comparing samples of the at least one generated sampling to a validation threshold (see paragraph 0124). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Ariyavisitakul and Thon as suggested by Shattil to select only samples which their power levels meet a predetermined threshold to enhance the integrity of the output signal.

As to claims 8 and 18, Shattil further discloses discarding samples of the at least one generated sampling that are determined to be invalid (see paragraph 0124). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Ariyavisitakul and Thon as suggested by Shattil to enhance the integrity of the output signal.

6. Claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ariyavisitakul, Thon and Shattil, further in view of Best et al. (hereafter, referred as Best) (US 6,570,944).

As to claims 7 and 17, Ariyavisitakul, Thon, and Shattil disclose all the subject matters claimed in claims 5 and 15, except for generating leading edge samples and trailing edge samples from the received input signal; and varying an eye center threshold to determine the validity of the at least one generated sampling. Best, in the same field of endeavor, disclose an apparatus that reduces sampling errors for data

Art Unit: 2611

communicated between devices (see the abstract). Best disclose that in any high-speed signaling system, the ability of the receiving device to sample the data signal at a precise instant within the valid data interval (the "data eye") is often a critical factor in determining how brief the data eye may be. Best further discloses that any technique for more accurately controlling the sampling instant within the data eye generally permits faster data transfer and therefore higher signaling bandwidth. Best further shows generating leading edge samples and trailing edge samples from the received input signal (see Fig. 2) and delaying the signal so that the delayed signal transitions at the midpoint of the data eye (interpreted as varying an eye center threshold to determine the validity of the at least one generated sampling). Therefore, for the reasons stated above, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Ariyavisitakul, Thon, and Shattil as suggested by Best.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2611

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Leila Malek
Examiner
Art Unit 2611

L.M


MOHAMMED GHAYOUR
SUPERVISORY PATENT EXAMINER